

IN THE CLAIMS:

Claims 1 - 77 (canceled)

Claim 78 (currently amended) An apparatus for embossing a substantially continuous web of sheet material, including an embossing roll comprising:

an elongated core having first and second ends, said elongated core being formed of a substantially rigid material;

an elongated sleeve having an embossing pattern formed thereon, said elongated sleeve being formed of a material which is less rigid than said core, said elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500"; and

a positioning means for selectively positioning said sleeve with respect to said core, wherein the positioning means includes means for communicating pressurized air to an outer surface of the core for forming an air cushion between the core and the sleeve, the air pressure at a pressure of at least about 100 p.s.i. to about 300 p.s.i.,

wherein said elongated sleeve is releasably secured to said core such that said elongated sleeve is axially and circumferentially fixed with respect to said core when in operation and wherein said elongated sleeve can be selectively axially removed from said core when the pressurized air is provided to the outer surface of the core.

Claim 79 (previously presented) The apparatus according to claim 78, wherein the elongated sleeve material has a hardness of less than 30 P&J.

Claim 80 (previously presented) The apparatus according to claim 78, wherein the elongated sleeve material has a hardness of less than 20 P&J.

Claim 81 (previously presented) The apparatus according to claim 78, wherein the elongated sleeve material has a hardness of approximately 10 P&J.

Claim 82 (previously presented) The apparatus according to claim 78, wherein said core is formed of steel.

Claim 83 (previously presented) The apparatus according to claim 78, wherein said elongated sleeve is formed of a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 84 (previously presented) The apparatus according to claim 78, wherein said elongated sleeve is covered with a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 85 (previously presented) The apparatus according to claim 78, wherein said embossing pattern is formed in an outer surface of said sleeve.

Claim 86 (previously presented) The apparatus according to claim 78, wherein said embossing pattern is engraved in said outer surface of said sleeve.

Claim 87 (previously presented) The apparatus according to claim 78, wherein said embossing pattern is laser engraved in said outer surface.

Claim 88 (previously presented) The apparatus according to claim 78, wherein said embossing pattern includes embossing elements having curvilinear side walls, spherical surfaces and multiple elevations with respect to a reference surface.

Claim 89 (currently amended) The apparatus according to claim 78, wherein said positioning means includes at least one axially extending bore and at least one radially extending bore intersecting said axially extending bore formed in said core for selectively communicating pressurized air to ~~[[a]]~~ the outer surface of said core.

Claim 90 (previously presented) The apparatus according to claim 78, wherein said sleeve is formed of an expandable material such that when pressurized air is passed to said surface of said core, said sleeve expands so as to be displaceable with respect to said core.

Claim 91 (previously presented) The apparatus according to claim 78, wherein said core includes a plurality of radially extending bores intersecting said axially extending bore.

Claim 92 (currently amended) The apparatus according to claim 91, further comprising a circumferential groove in ~~[[a]]~~ the outer surface of said core interconnecting said radially extending passages.

Claim 93 (previously presented) The apparatus according to claim 92, wherein said circumferential groove is 0.0625" to 0.1875" wide and 0.0625" to 0.1875" deep.

Claim 94 (previously presented) The apparatus according to claim 78, wherein an inner diameter of said sleeve is substantially constant.

Claim 95 (previously presented) The apparatus according to claim 78, wherein an inner surface of said sleeve adjacent respective ends of said sleeve is tapered outwardly to facilitate positioning of said sleeve on said core.

Claim 96 (currently amended) The apparatus according to claim 78, wherein said positioning means includes a frusto-conical portion on the outer surface of said core and a substantially complimentary frusto-conical inner surface of said sleeve and fixing means for axially securing said sleeve with respect to said core such that said sleeve can be axially received over said core.

Claim 97 (currently amended) A system for selectively positioning an embossing roll, comprising:

providing an elongated core formed of a substantially rigid material;

providing an elongated sleeve having an embossing pattern formed thereon, the sleeve formed of a material less rigid than said core, said elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500";

positioning the sleeve over the core; and

a means for communicating pressurized air from a central bore of the core to an outer surface of the core for forming an air cushion between the core and the sleeve, the air cushion capable of selectively expanding an inner surface of the sleeve with respect to the core while sliding the sleeve along the core, the air at a pressure of at least about 100 p.s.i. to about 300 p.s.i.

Claim 98 (previously presented) The system according to claim 97, wherein the pressure is provided at a pressure of from at least 150 p.s.i. to about 250 p.s.i.

Claim 99 (previously presented) The system according to claim 97, wherein the pressure is provided at a pressure of approximately 200 p.s.i.

Claim 100 (previously presented) The system according to claim 97, wherein the sleeve is laser engraved.

Claim 101 (previously presented) The system according to claim 97, wherein the core is steel.

Claim 102 (canceled)

Claim 103 (previously presented) The system according to claim 97, wherein the sleeve is formed of a material having a hardness of less than 30 P&J.

Claim 104 (previously presented) The system according to claim 97, wherein the sleeve is formed of a material having a hardness of less than 20 P&J.

Claim 105 (previously presented) The system according to claim 97, wherein the sleeve is formed of a material having a hardness of approximately 10 P&J.

Claim 106 (previously presented) The system according to claim 97, wherein said elongated sleeve is formed of a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 107 (previously presented) The system according to claim 97, wherein said elongated sleeve is covered with a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 108 (currently amended) A system for embossing a substantially continuous web of material comprising:

a supply means for supplying at least one substantially continuous web of material;

feed means for feeding said substantially continuous web of material;

embossing means for embossing a predetermined pattern in said web material;

and

a take-up means for taking-up said web material;

said embossing means comprising;

at least one elongated core formed of a substantially rigid material; and

a plurality of elongated sleeves each having an embossing pattern formed thereon, and each sleeve formed of a material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500";

a positioning means for selectively positioning said sleeve with respect to said core, wherein the positioning means includes means for communicating pressurized air to an outer surface of the core for forming an air cushion between the core and the sleeve, the air pressure at a pressure of at least about 100 p.s.i. to about 300 p.s.i.,

wherein said plurality of elongated sleeves are interchangeable with one another with each of said plurality of elongated sleeves being selectively secured to said core in accordance with the predetermined embossing pattern formed thereon.

Claim 109 (previously presented) The system according to claim 108, wherein at least one of the sleeves has a hardness of less than 30 P&J.

Claim 110 (previously presented) The system according to claim 108, wherein at least one of the sleeves has a hardness of less than 20 P&J.

Claim 111 (previously presented) The system according to claim 108, wherein at least one of the sleeves has a hardness of approximately 10 P&J.

Claim 112 (previously presented) The system according to claim 108, wherein the core is formed of steel.

Claim 113 (previously presented) The system according to claim 108, wherein said elongated sleeve is formed of a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 114 (previously presented) The system according to claim 108, wherein said elongated sleeve is covered with a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 115 (previously presented) The system according to claim 108, wherein said embossing pattern is engraved in an outer surface of said sleeve.

Claim 116 (previously presented) The system according to claim 108, wherein said embossing pattern is laser engraved in said outer surface.

Claim 117 (previously presented) The system according to claim 108, wherein said embossing pattern includes embossing elements having curvilinear side walls and spherical surfaces, and multiple elevations with respect to a reference surface.

Claim 118 (currently amended) The system according to claim 108, wherein said positioning means includes at least one axially extending bore and at least one radially extending bore intersecting said axially extending bore formed in said core for selectively communicating pressurized air to ~~[[a]]~~ the outer surface of said core.

Claim 119 (previously presented) The system according to claim 108, wherein said sleeve is formed of an expandable material such that when pressurized air is passed to said surface of said core, said sleeve expands so as to be displaceable with respect to said core.

Claim 120 (previously presented) The system according to claim 108, wherein said core includes a plurality of radially extending bores intersecting said axially extending bore.

Claim 121 (currently amended) The system according to claim 120, further comprising a circumferential groove in [[a]] the outer surface of said core interconnecting said radially extending passages.

Claim 122 (previously presented) The system as defined in claim 121, wherein said circumferential groove is 0.0625" to 0.1875" wide and 0.0625" to 0.1875" deep.

Claim 123 (previously presented) The system as defined in claim 108, wherein an inner diameter of said sleeve is substantially constant.

Claim 124 (previously presented) The system as defined in claim 108, wherein an inner surface of said sleeve adjacent respective ends of said sleeve is tapered outwardly to facilitate positioning of said sleeve on said core.

Claim 125 (currently amended) The system as defined in claim 108, wherein said positioning means includes a frusto-conical portion on the outer surface of said core and a substantially complimentary frusto-conical inner surface of said sleeve and fixing means for axially securing said sleeve with respect to said core such that said sleeve can be axially received over said core.

Claim 126 (currently amended) A system for embossing a substantially continuous web of material comprising:

a supply means for supplying at least one substantially continuous web of material;

feed means for feeding said substantially continuous web of material;

embossing means for embossing a predetermined pattern in said web material;

and

a take-up means for taking-up said web material;

wherein at least one roll of the system includes;

an elongated core formed of a substantially rigid material;

an elongated sleeve formed of a material less rigid than said elongated core, the elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500", with said elongated sleeve being releasably secured to said core such that said elongated sleeve is axially and circumferentially fixed with respect to said core when in operation and can be selectively axially removed from said core; and

a positioning means for selectively positioning said sleeve with respect to said core, wherein the positioning means includes means for communicating pressurized air to an outer surface of the core for forming an air cushion between the core and the sleeve, the air pressure at a pressure of at least about 100 p.s.i. to about 300 p.s.i.,

wherein said sleeve is formed of an expandable material such that when pressurized air is passed to said surface of said core, said sleeve expands so as to be displaceable with respect to said core and said sleeve includes an embossing pattern.

Claim 127 (previously presented) The system according to claim 126, wherein the elongated sleeve material has a hardness of less than 30 P&J.

Claim 128 (previously presented) The system according to claim 126, wherein the elongated sleeve material has a hardness of less than 20 P&J.

Claim 129 (previously presented) The system according to claim 126, wherein the elongated sleeve material has a hardness of approximately 10 P&J.

Claim 130 (previously presented) The system according to claim 126, wherein said core is formed of steel.

Claim 131 (previously presented) The system according to claim 126, wherein said elongated sleeve is formed of a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 132 (previously presented) The system according to claim 126, wherein said elongated sleeve is covered with a material selected from a group consisting of metallic alloys, ceramic, polymers, fiberglass, kevlar, vulcanized rubber and fiber reinforced resins.

Claim 133 (previously presented) The system according to claim 126, wherein said sleeve includes an embossing pattern engraved in an outer surface of said sleeve.

Claim 134 (previously presented) The system according to claim 126, wherein said embossing pattern is laser engraved in said outer surface.

Claim 135 (previously presented) The system according to claim 126, wherein said embossing pattern includes embossing elements having curvilinear side walls and spherical surfaces and multiple elevations with respect to a reference surface.

Claim 136 (currently amended) The system according to claim 126, wherein said positioning means includes at least one axially extending bore and at least one radially extending bore intersecting said axially extending bore formed in said core for selectively communicating pressurized air to ~~[[a]]~~ the outer surface of said core.

Claim 137 (previously presented) The system according to claim 126, wherein said core includes a plurality of radially extending bores intersecting said axially extending bore.

Claim 138 (currently amended) The system according to claim 137, further comprising a circumferential groove in ~~[[a]]~~ the outer surface of said core interconnecting said radially extending passages.

Claim 139 (previously presented) The system according to claim 138, wherein said circumferential groove is .0625" to .1875" wide and .0625" to .1875" deep.

Claim 140 (previously presented) The system according to claim 126, wherein an inner diameter of said sleeve is substantially constant.

Claim 141 (previously presented) The system according to claim 126, wherein an inner surface of said sleeve adjacent respective ends of said sleeve is tapered outwardly to facilitate positioning of said sleeve on said core.

Claim 142 (currently amended) The system according to claim 126, wherein said positioning means includes a frusto-conical portion on the outer surface of said core and a substantially complimentary frusto-conical inner surface of said sleeve and fixing means for axially securing said sleeve with respect to said core such that said sleeve can be axially received over said core.

Claim 143 (currently amended) An apparatus for embossing a substantially continuous web of sheet material, including an embossing roll comprising:

an elongated core having first and second ends, said elongated core being formed of a substantially rigid material;

an elongated sleeve having an embossing pattern formed thereon, said elongated sleeve being formed of a material which is less rigid than said core, said

elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500"; and

a positioning means for selectively positioning said sleeve with respect to said core, wherein said positioning means includes at least one axially extending bore and a plurality of radially extending bores intersecting said axially extending bore, wherein at least one substantially circumferential groove in a surface of said core interconnects the distal ends of said radially extending passages, and wherein said radially extending bores are capable of communicating pressurized air from said core to said circumferential groove, the air pressure at a pressure of at least about 100 p.s.i to about 300 p.s.i, and the pressurized air forming an air cushion between the sleeve and the core,

wherein said elongated sleeve is releasably secured to said core such that said elongated sleeve is axially and circumferentially fixed with respect to said core when in operation and can be selectively axially removed from said core.

Claim 144 (currently amended) A system for selectively positioning an embossing roll, comprising:

providing an elongated core formed of a substantially rigid material;

providing an elongated sleeve having an embossing pattern formed thereon, the sleeve formed of a material less rigid than said core, said elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500";

sliding the sleeve over the core; and

communicating pressurized air from a central bore of the core to an outer surface of the core for forming an air cushion between the core and the sleeve, the air cushion selectively expanding an inner surface of the sleeve with respect to the core while sliding the sleeve along the core, the air pressure at a pressure of at least about 100 p.s.i. to about 300 p.s.i.,

wherein the pressurized air is communicated from said central bore to said outer surface of the core through a plurality of radially extending bores intersecting said axially extending bore, and wherein at least one substantially circumferential groove in a surface of said core interconnects the distal ends of said radially extending passages.

Claim 145 (currently amended) A system for embossing a substantially continuous web of material comprising:

a supply means for supplying at least one substantially continuous web of material;

feed means for feeding said substantially continuous web of material;

embossing means for embossing a predetermined pattern in said web material;

and

a take-up means for taking-up said web material;

said embossing means comprising;

at least one elongated core formed of a substantially rigid material; and

a plurality of elongated sleeves each having an embossing pattern formed thereon, the elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500";

a positioning means for selectively positioning said sleeve with respect to said core, wherein said positioning means includes at least one axially extending bore and a plurality of radially extending bores intersecting said axially extending bore, wherein at least one substantially circumferential groove in a surface of said core interconnects the distal ends of said radially extending passages, and wherein said radially extending bores are capable of communicating pressurized air from said core to said circumferential groove, the air pressure at a pressure of at least about 100 p.s.i. to about 300 p.s.i. and the pressurized air forming an air cushion between the sleeve and the core,

wherein said plurality of elongated sleeves are interchangeable with one another with each of said plurality of elongated sleeves being selectively secured to said core in accordance with the predetermined embossing pattern formed thereon.

Claim 146 (currently amended) A system for embossing a substantially continuous web of material comprising:

a supply means for supplying at least one substantially continuous web of material;

feed means for feeding said substantially continuous web of material;

embossing means for embossing a predetermined pattern in said web material;

and

a take-up means for taking-up said web material;

wherein at least one roll of the system includes;

an elongated core formed of a substantially rigid material;

an elongated sleeve formed of a material less rigid than said elongated core, the elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500", with said elongated sleeve being releasably secured to said core such that said elongated sleeve is axially and circumferentially fixed with respect to said core when in operation and can be selectively axially removed from said core; and

a positioning means for selectively positioning said sleeve with respect to said core, wherein said positioning means includes at least one axially extending bore and a plurality of radially extending bores intersecting said axially extending bore, wherein at least one substantially circumferential groove in a surface of said core interconnects the distal ends of said radially extending passages, and wherein said radially extending bores are capable of communicating pressurized air from said core to said circumferential groove,

wherein said sleeve is formed of an expandable material such that when pressurized air at a pressure of at least about 100 p.s.i. to about 300 p.s.i. is passed to said surface of said core, thereby forming an air cushion between the sleeve and the core, said sleeve expands so as to be displaceable with respect to said core and said sleeve includes an embossing pattern.

Claim 147 (currently amended) An apparatus for embossing a substantially continuous web of sheet material, including an embossing roll comprising:

an elongated core having first and second ends, said elongated core being formed of a substantially rigid material;

an elongated sleeve having an embossing pattern formed thereon, said elongated sleeve being formed of a material which is less rigid than said core, the elongated sleeve material having a hardness of less than 40 P&J and having a thickness in the range of about 0.025" to about 0.500"; and

a positioning means for selectively positioning said sleeve with respect to said core, wherein said positioning means includes a substantially circumferential air curtain, the air curtain being formed by air pressure provided at a pressure of at least about 100 p.s.i. to about 300 p.s.i., and

wherein said elongated sleeve is releasably secured to said core such that said elongated sleeve is axially and circumferentially fixed with respect to said core when in operation and can be selectively axially removed from said core.